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ABSTRACT

This document is a collection of 43 overhead transparency masters to be used as teaching aids in a course of study involving soils such as geology, agronomy, hydrology, earth science, or land use study. Some transparencies are in color. Selected titles of transparencies may give the reader a better understanding of the graphic content. Titles are: Soil Formation, Soil Textures, Permability, Organic Matter in the Soil, A Soil Profile, Strip Cropping, Degrees of Erosion, Drainage Classes, Capability Classes, and A Soil and Water Conservation Plan. Many of these overhead transparencies would be appropriate for use with children from eighth grade through college. (MR)

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SE024 178

SOIL FORMATION

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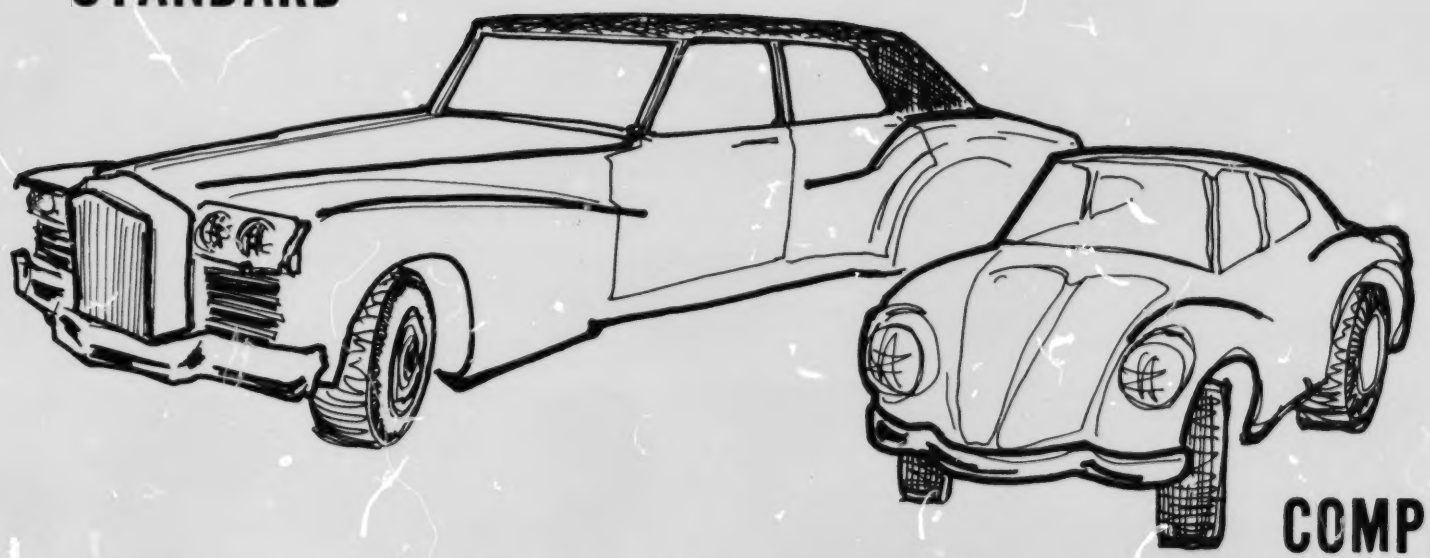
CLASSIFICATION OF THINGS

STANDARD



COMPACT

WE CLASSIFY THINGS TO SAVE WORDY DESCRIPTIONS

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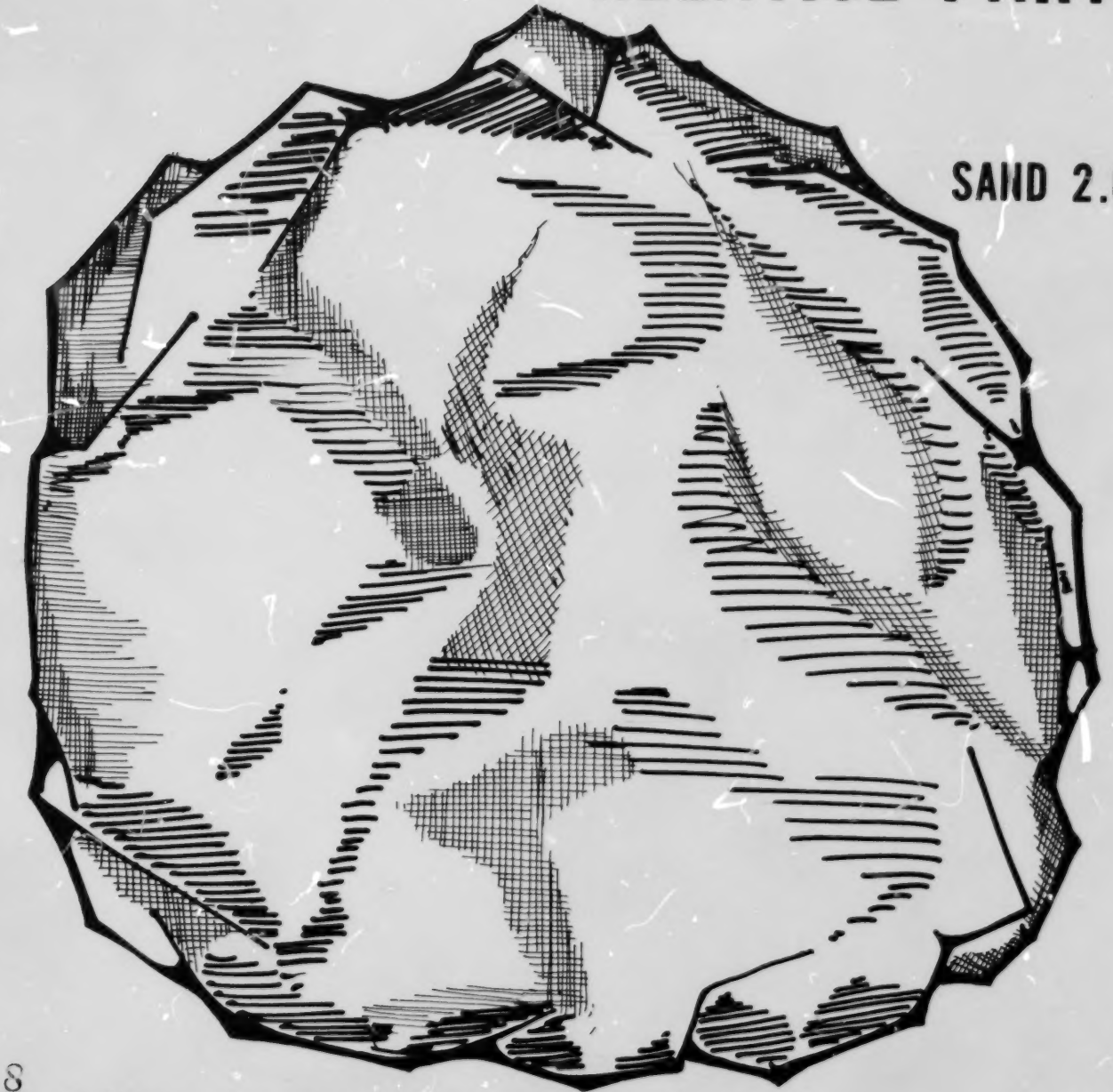
RELATIVE PARTICLE SIZES



SAND 2.0–0.05 mm

SILT

0.05–0.002 mm

CLAY
Less than
0.002 mm

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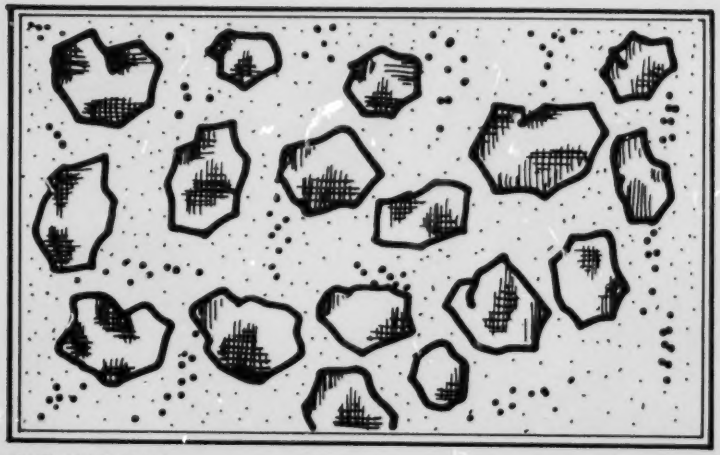
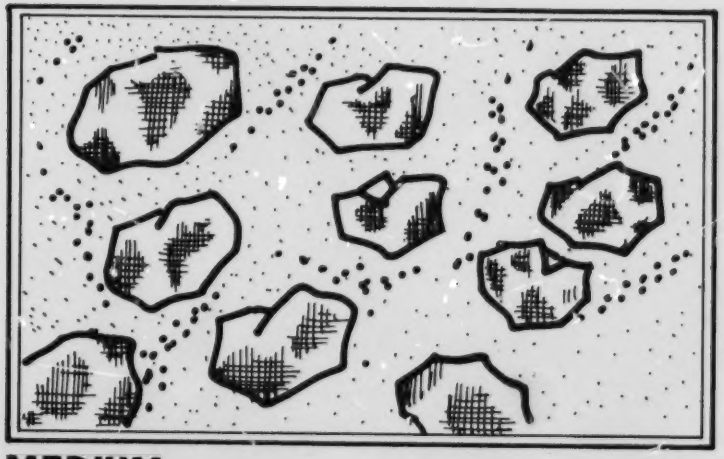
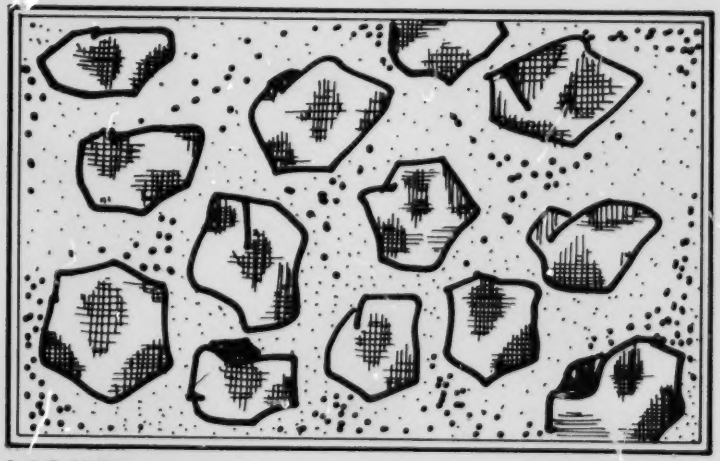
SOIL TEXTURES



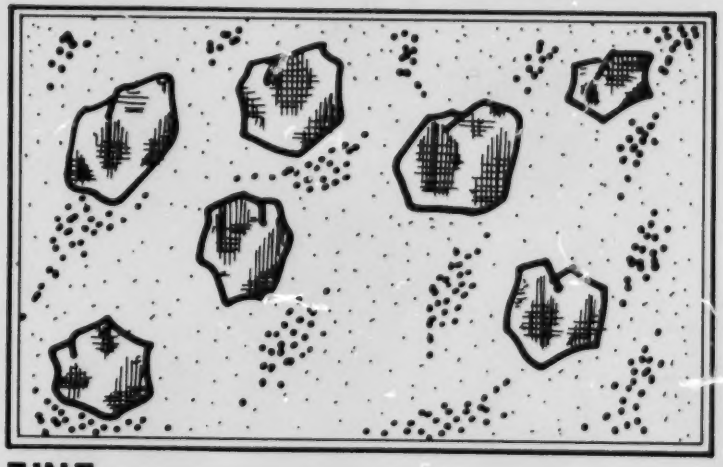
COARSE



MEDIUM



LIGHT



FINE

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FEEL of TEXTURES
THE FEEL OF SOIL

SAND	-	FEELS GRITTY
SILT	-	FEELS FLOURY
CLAY	-	FEELS STICKY OR SLICK --WHEN WET--
LOAMS	-	FEEL NEITHER VERY STICKY NOR VERY GRITTY

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TEXTURES

COARSE -VERY GRITTY

LIGHT -MOSTLY GRITTY

MEDIUM -SLIGHTLY GRITTY

FINE -STICKY

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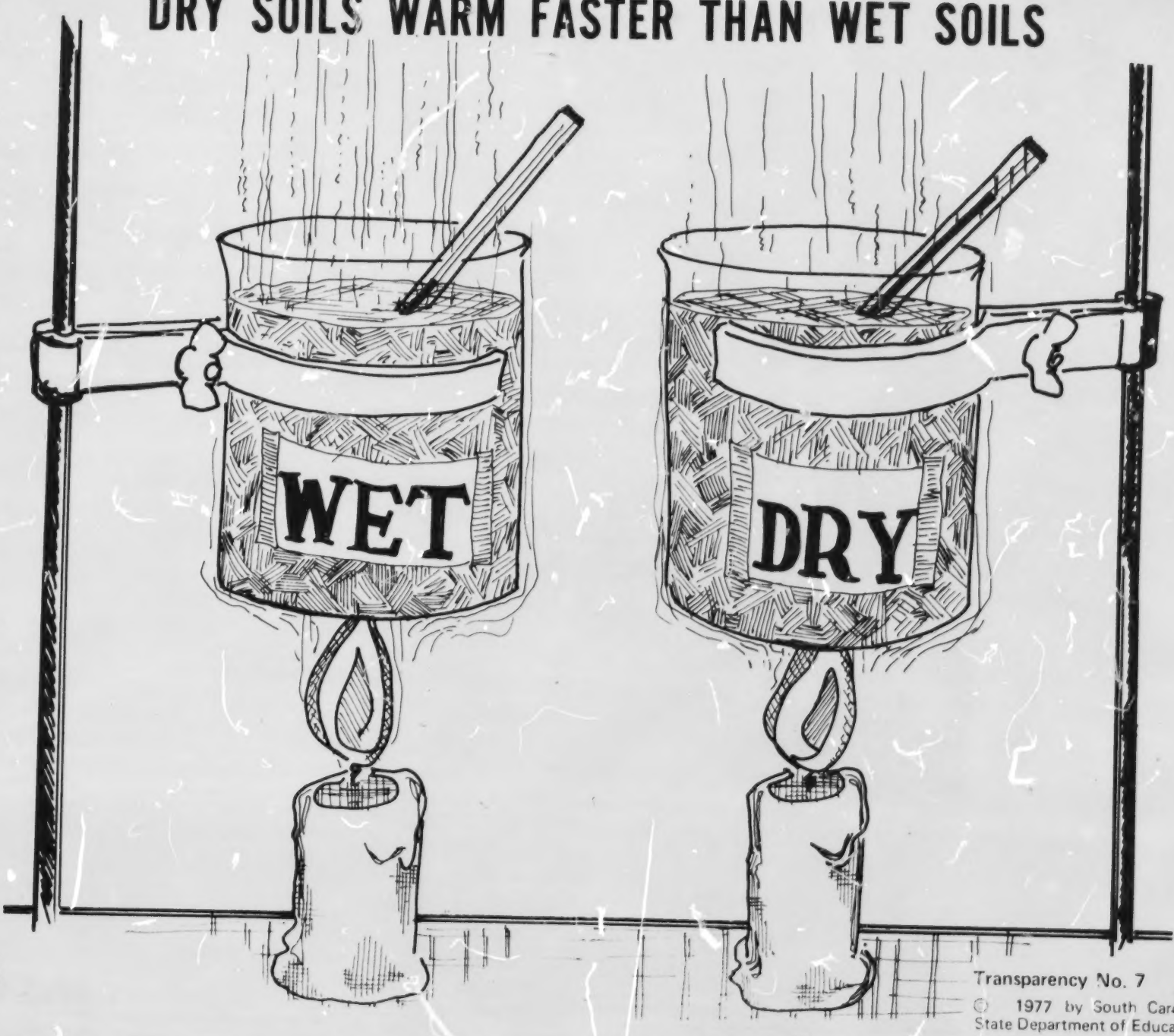
DRY SOILS WARM FASTER THAN WET SOILS



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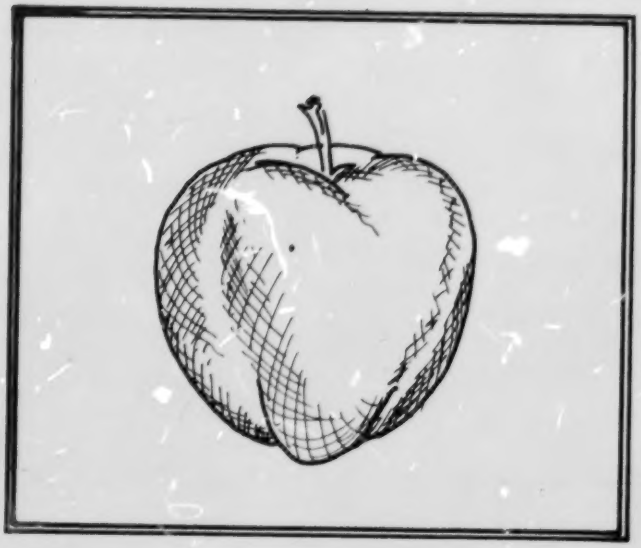
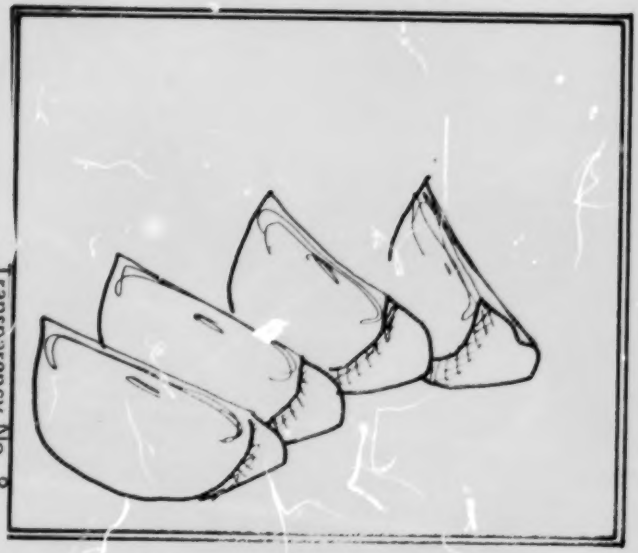
An Increase In Particle Number Per Unit Increases Surface Area





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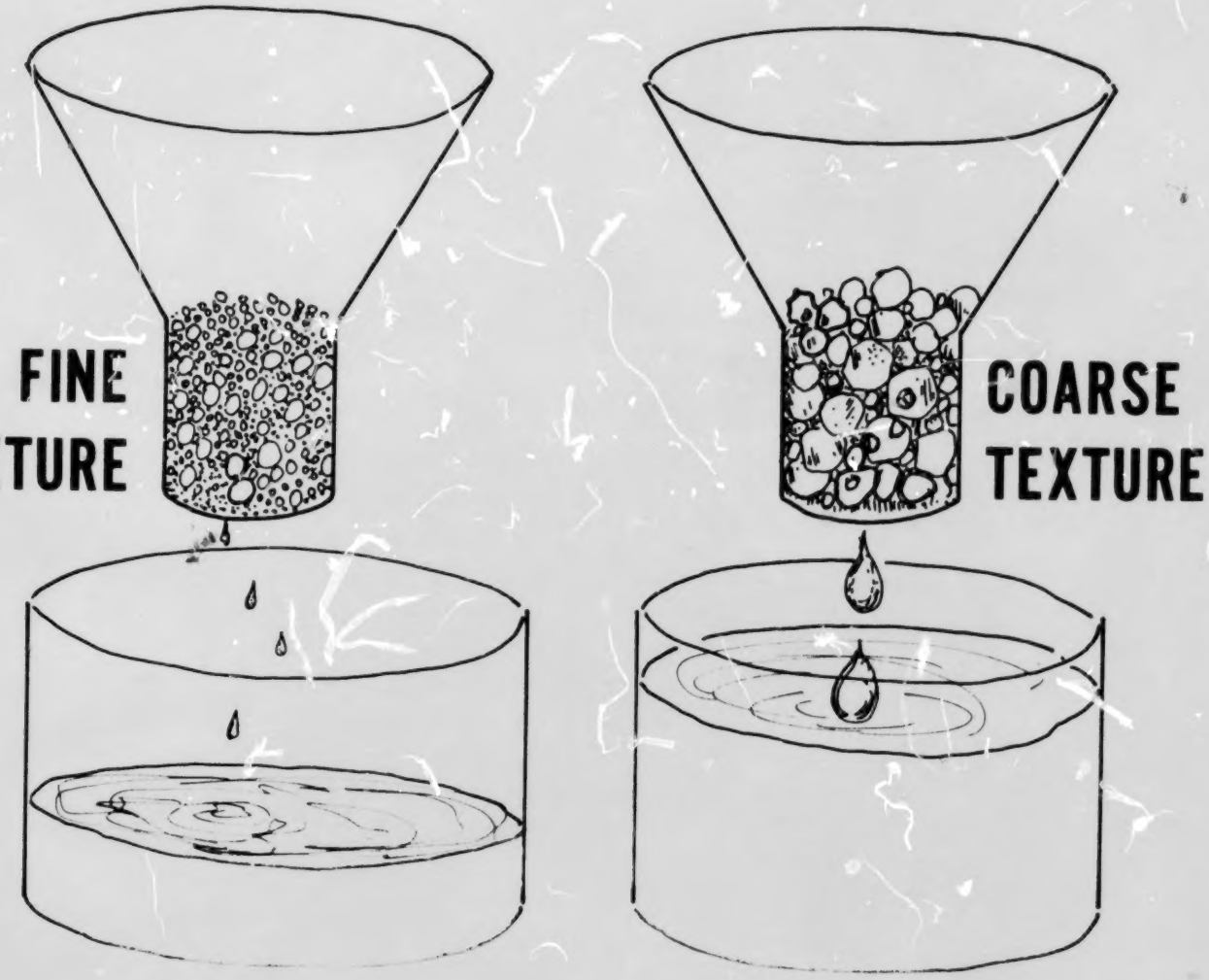
SLOW

FAST



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TEXTURE OF A SOIL DETERMINES

THE RATE AT WHICH WATER CAN ENTER THE SOIL

THE WATER-HOLDING CAPACITY OF THE SOIL

THE RATE AT WHICH PLANT NUTRIENTS LEACH

THE KIND OF CROPS WHICH CAN BE GROWN

THE METHOD OF TILLAGE

THE RATE OF MOVEMENT OF SOIL BY EROSION AGENTS

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CHARACTERISTICS OF COARSE AND LIGHT TEXTURED SOILS

LEACH RAPIDLY, SURFACE DRIES OUT QUICKLY

ARE USUALLY LOW IN PLANT NUTRIENTS

REQUIRE FREQUENT BUT LIGHT APPLICATIONS OF PLANT NUTRIENTS

ARE EASY TO WORK, CAN BE PLOWED SOON AFTER RAIN

USUALLY REQUIRE EXTRA POTASH

ARE NOT WELL ADAPTED TO CLOVER AND MOST LEGUMES AND GRASSES (EXCEPT SERICEA, COASTAL BERMUDA, AND BAHIA GRASS).

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CHARACTERISTICS OF MEDIUM AND FINE TEXTURED SOILS

ABSORB WATER MORE SLOWLY THAN LIGHT SOILS

HOLD MORE WATER THAN LIGHT, SANDY SOILS

CONTAIN MORE PLANT NUTRIENTS

ARE MORE DIFFICULT TO WORK

ARE BETTER SUITED TO GRASSES AND LEGUMES THAN LIGHTER SOILS

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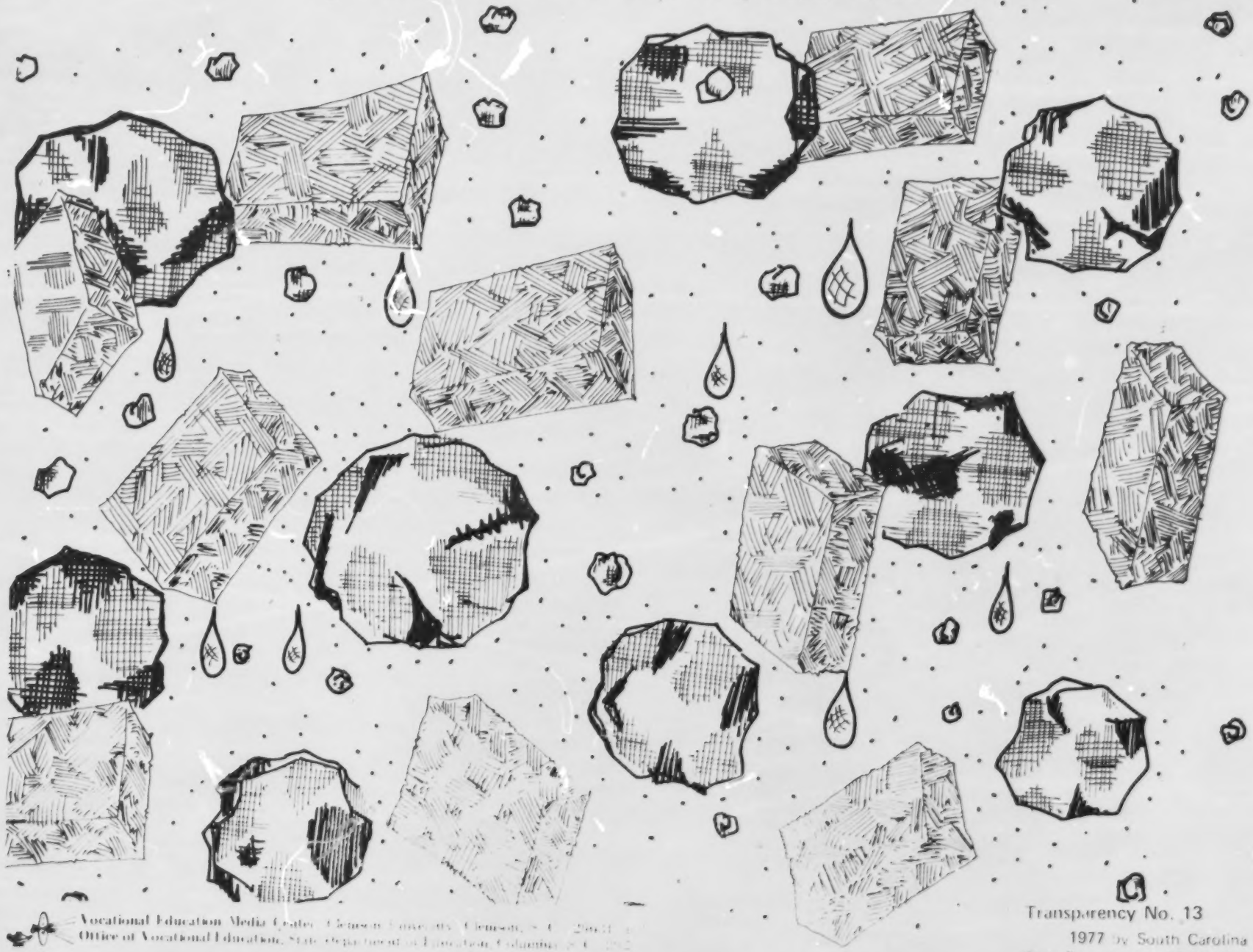
ORGANIC MATTER IN THE SOIL



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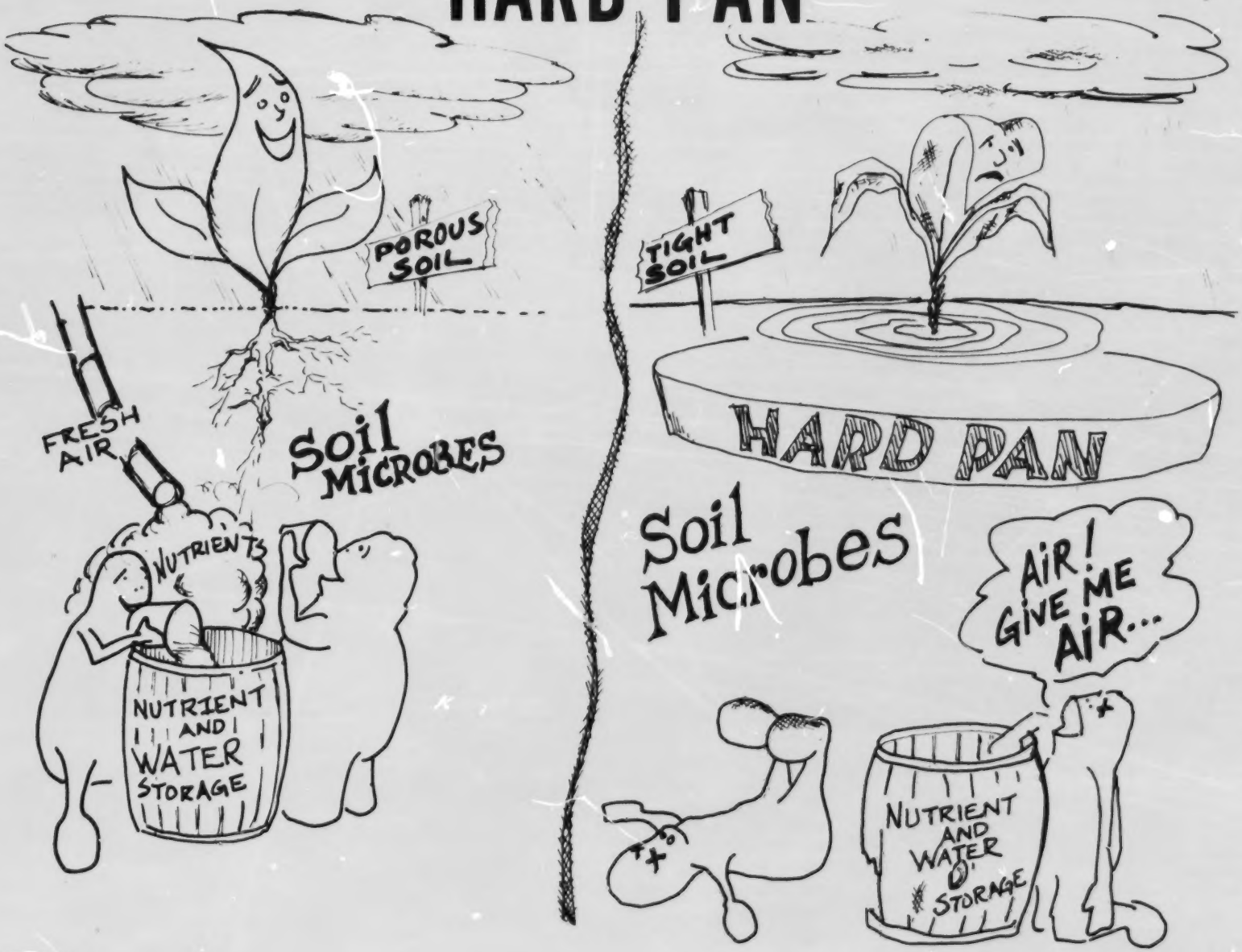
HARD PAN



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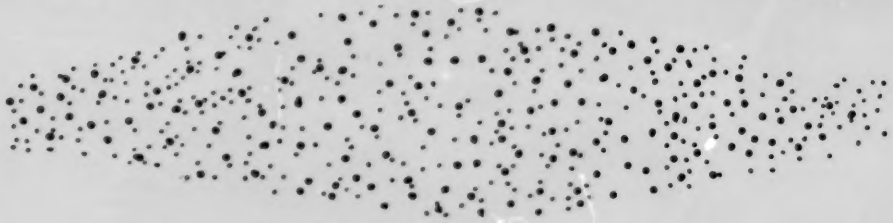
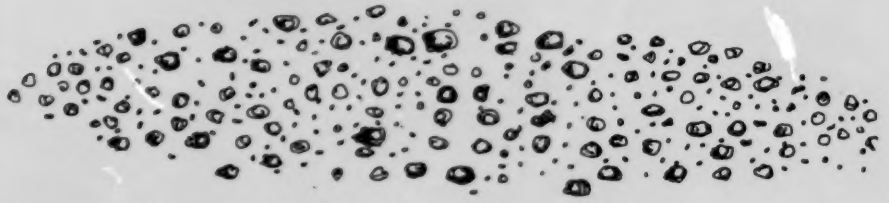
CLASSIFICATIONS USED TO DESCRIBE STRUCTURE

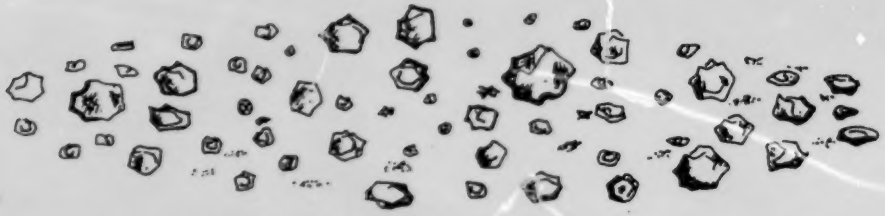
SINGLE GRAINED



GRANULAR



BLOCKY



PLATY

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DEGREES OF PERMEABILITY

SLOW - STICKY OR PLASTIC CLAY SUBSOILS - FEW PORES VISIBLE

MODERATE - GRANULAR CLAY - NUT-LIKE STRUCTURE - SOME PORES VISIBLE

RAPID - COARSE GRANULAR - NUMEROUS LARGE PORES

VERY RAPID - SINGLE GRAINED - MODERATE OR SMALL AMOUNT OF ORGANIC MATTER

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CLUES TO PERMEABILITY

SUBSOIL TEXTURE

SUBSOIL STRUCTURE

EASE OF NATURAL BREAKAGE

SIZE AND NUMBER OF PORES

AMOUNT OF ORGANIC MATTER

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SOIL DEPTH

	U.S. MEASUREMENT	APPROXIMATE METRIC
DEEP	40''+	1 meter
MODERATELY DEEP	20-40''	50-100 cm *
SHALLOW	10-20''	25-50 cm
VERY SHALLOW	0-10''	0-25 cm

* cm CENTIMETER

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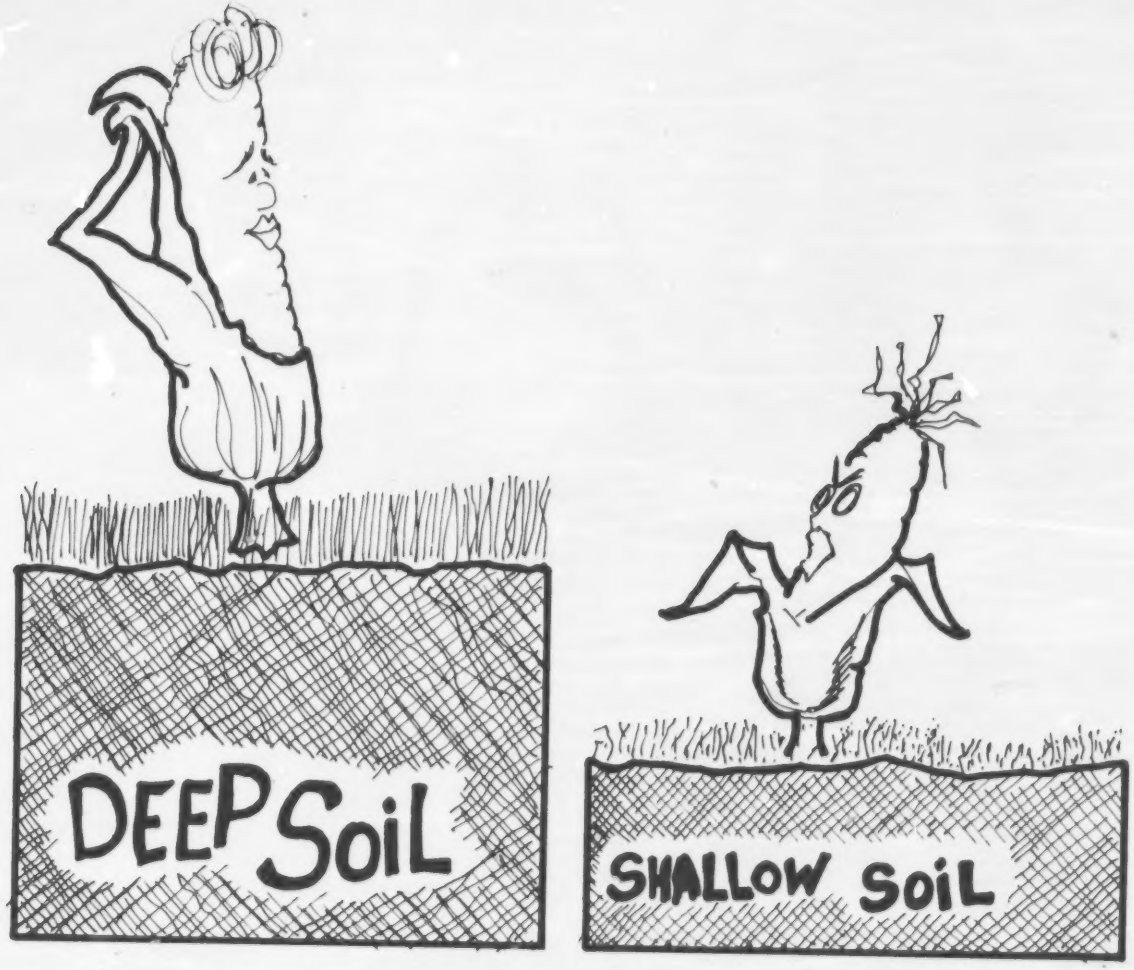
ADEQUATE ROOT ZONE



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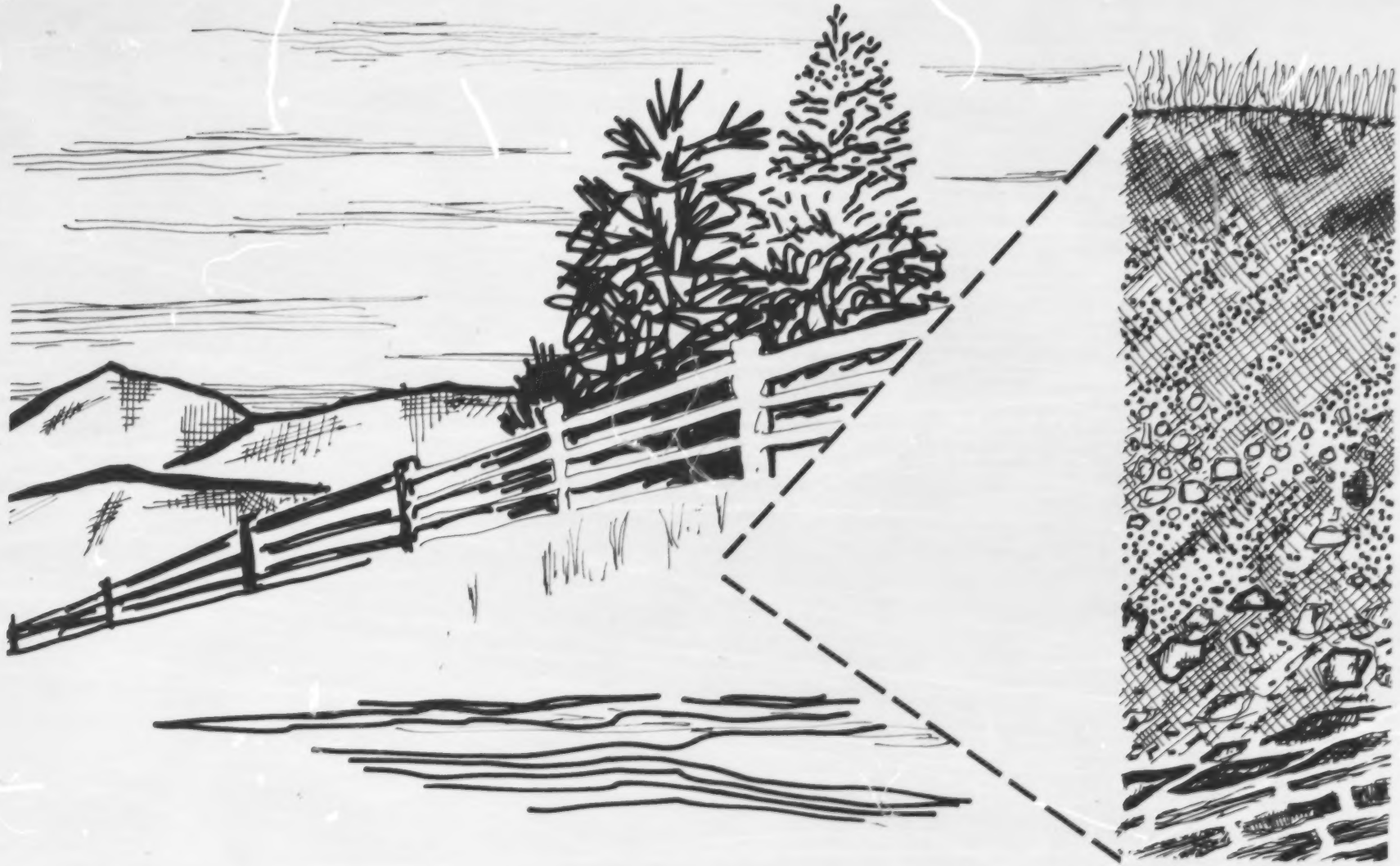
A SOIL PROFILE



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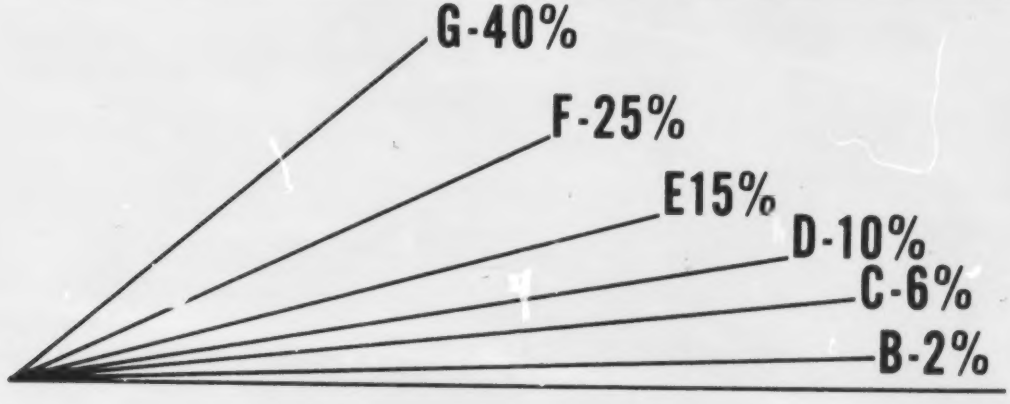
WHAT IS SOIL SLOPE?

DEGREE OF SLOPE	SLOPE CLASSIFICATION	NUMBER FEET FALL PER 100 FEET (30.48 meters) FEET	METERS
NEARLY LEVEL	A	0-2	0-.6m
GENTLY SLOPING	B	2-6	.6-1.8m
SLOPING	C	6-10	1.8-3.0m
STRONGLY SLOPING	D	10-15	3.0-4.6m
MODERATELY STEEP	E	15-25	4.6-7.6m
STEEP	F	25-40	7.6-12.2m
VERY STEEP	G	above 40	above 12.2m



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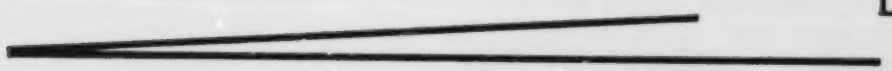
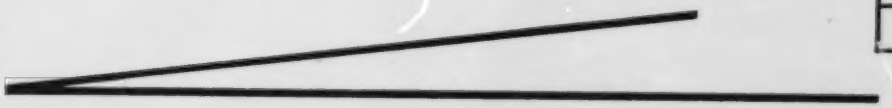
EFFECT OF SLOPE ON SOIL LOSS

3% SLOPE CLASS II

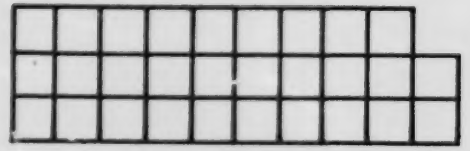


5 TONS

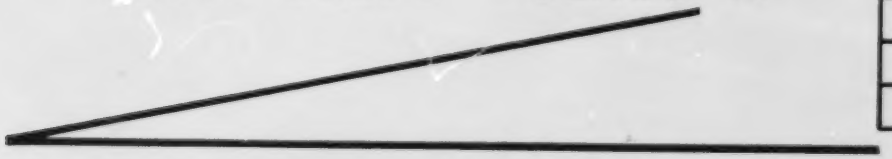
7% SLOPE CLASS III



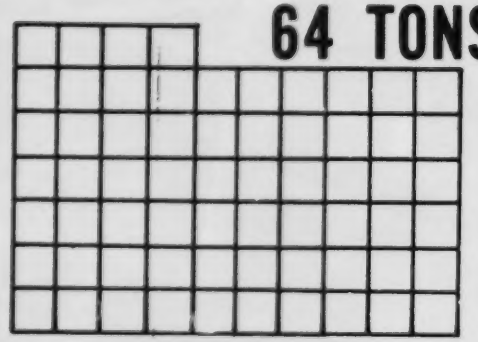
29 TONS



11% SLOPE CLASS IV



64 TONS



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STRIPCROPPING

STRIPCROPPING INVOLVES ALTERNATING STRIPS OF CLOSE GROWING CROPS WITH ROW CROPS

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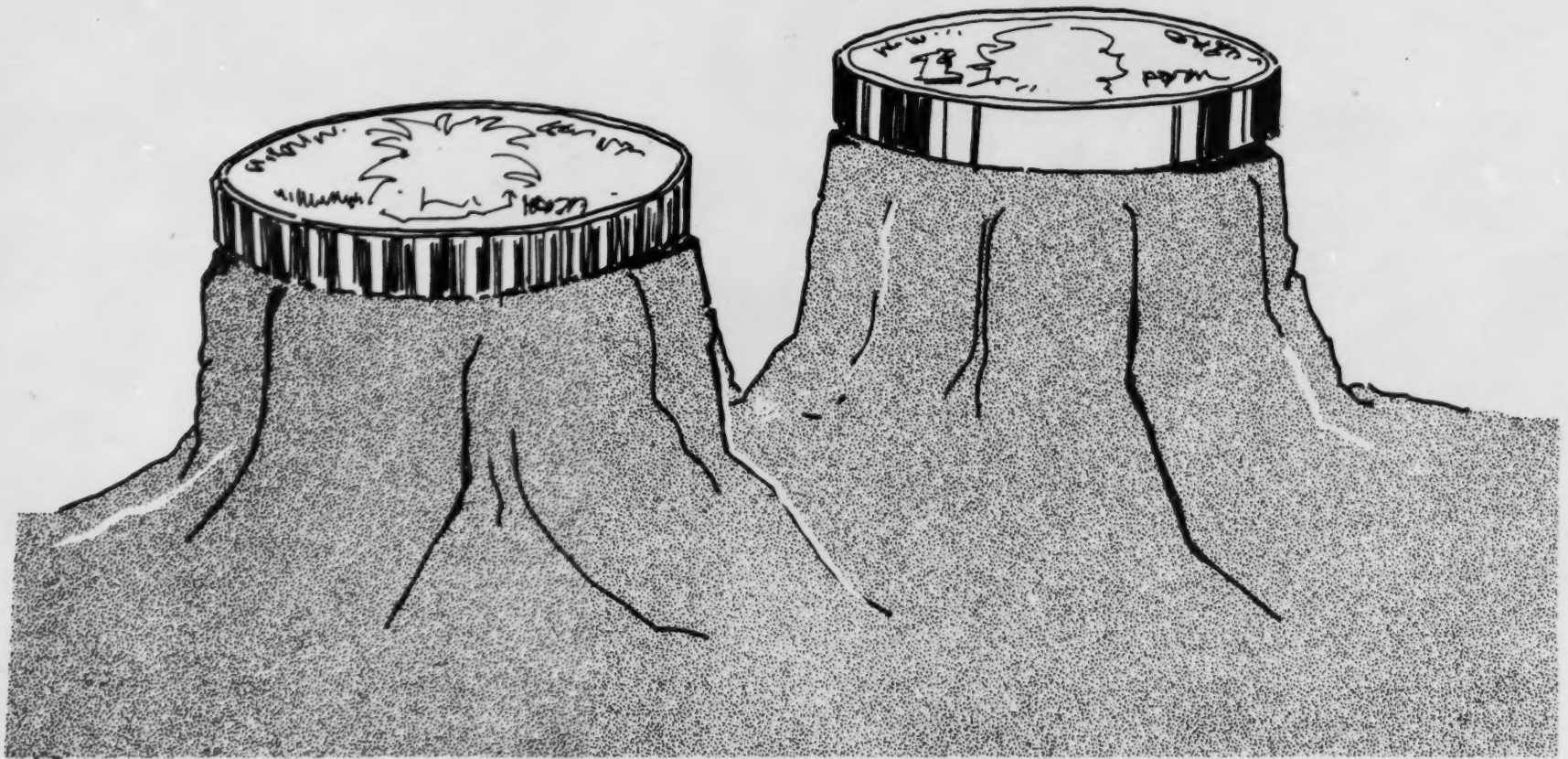
SOIL COVER HELPS PREVENT EROSION



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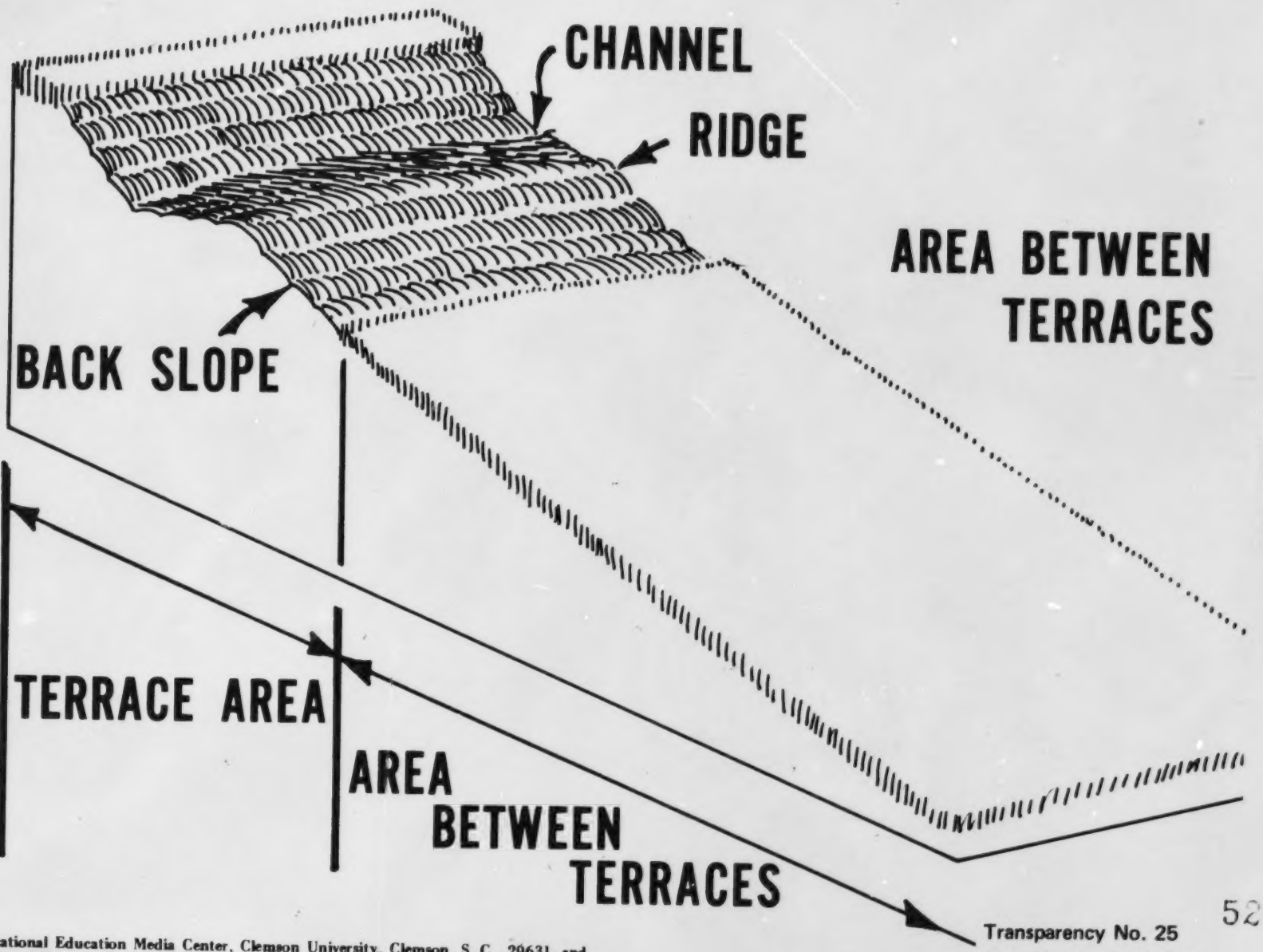
STRUCTURE OF A TERRACE



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EFFECTS OF EROSION

- LOSS OF ORGANIC MATTER AND NUTRIENTS
- LOSS OF SOIL PARTICLES
- SMALLER CROP YIELDS
- LESS WATER HOLDING CAPACITY
- INCREASED COST OF TILLAGE
- REDUCED BENEFITS OF FERTILIZER

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DEGREES OF EROSION

COLLUVIAL	DEPOSITS FROM SLOPES
ALLUVIAL	DEPOSITS FROM STREAMS
NONE TO SLIGHT	0-25% REMOVED
MODERATE	25-75% REMOVED
SEVERE	75-100% REMOVED
VERY SEVERE	BADLY GULLIED

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WHAT MUST WE KNOW TO PREVENT EROSION ?

PHYSICAL CHARACTERISTICS OF SOIL

HOW TO USE AND CONSERVE LAND

HOW TO APPLY TREATMENTS

HOW TO SELECT ADAPTABLE CROPS

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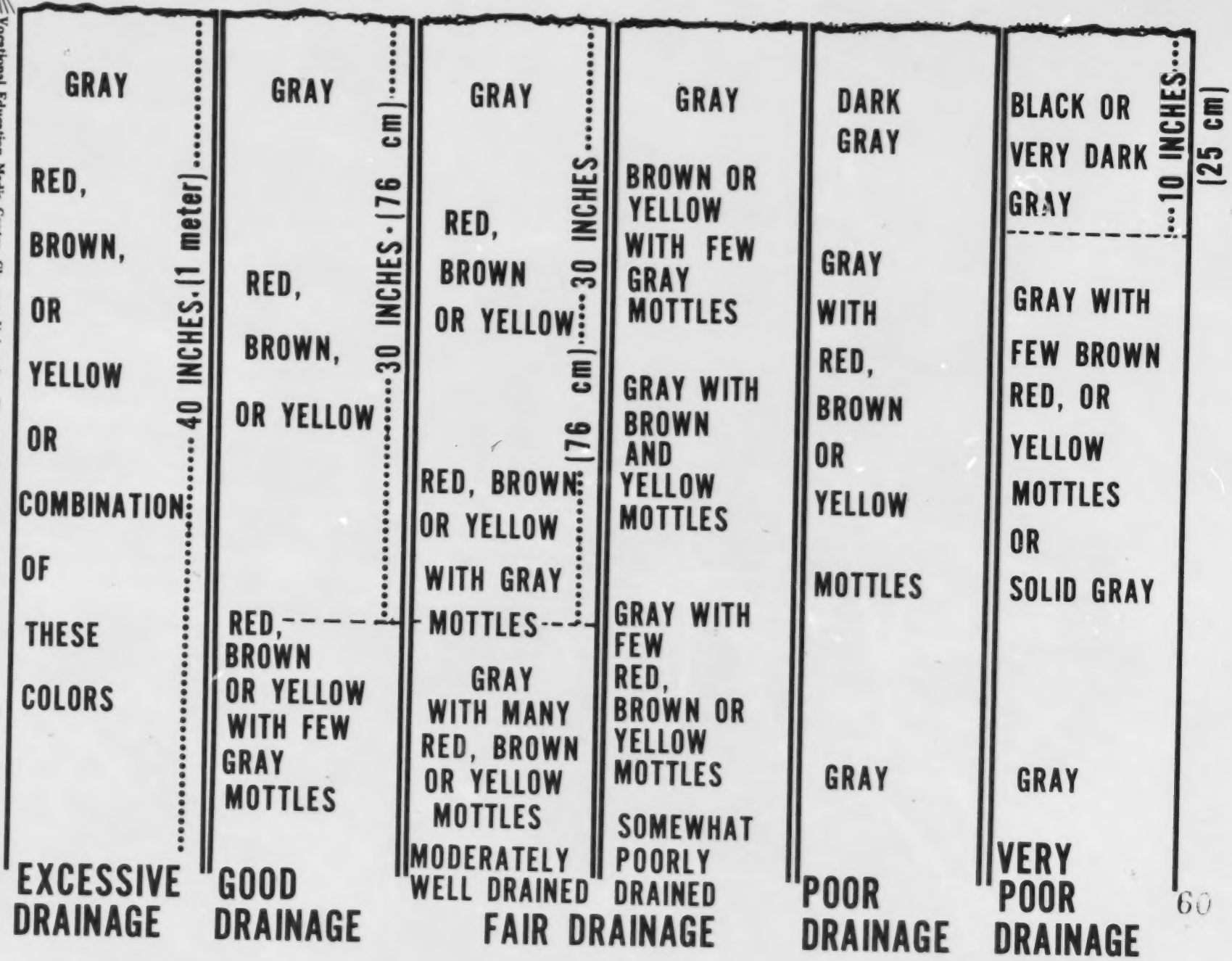
DRAINAGE CLASSES


GRAY
RED, BROWN, OR YELLOW OR COMBINATION OF THESE COLORS
40 INCHES (1 meter)
EXCESSIVE DRAINAGE
GRAY
RED, BROWN, OR YELLOW
30 INCHES (76 cm)
RED, BROWN OR YELLOW WITH FEW GRAY MOTTLES
GOOD DRAINAGE
GRAY
RED, BROWN OR YELLOW
30 INCHES (76 cm)
RED, BROWN OR YELLOW WITH GRAY MOTTLES
GRAY WITH MANY RED, BROWN OR YELLOW MOTTLES
MODERATELY WELL DRAINED
GRAY
BROWN OR YELLOW WITH FEW GRAY MOTTLES
GRAY WITH BROWN AND YELLOW MOTTLES
GRAY WITH FEW RED, BROWN OR YELLOW MOTTLES
SOMEWHAT POORLY DRAINED
FAIR DRAINAGE
DARK GRAY
GRAY WITH RED, BROWN OR YELLOW MOTTLES
GRAY
POOR DRAINAGE
BLACK OR VERY DARK GRAY
10 INCHES (25 cm)
GRAY WITH FEW BROWN RED, OR YELLOW MOTTLES OR SOLID GRAY
GRAY
VERY POOR DRAINAGE

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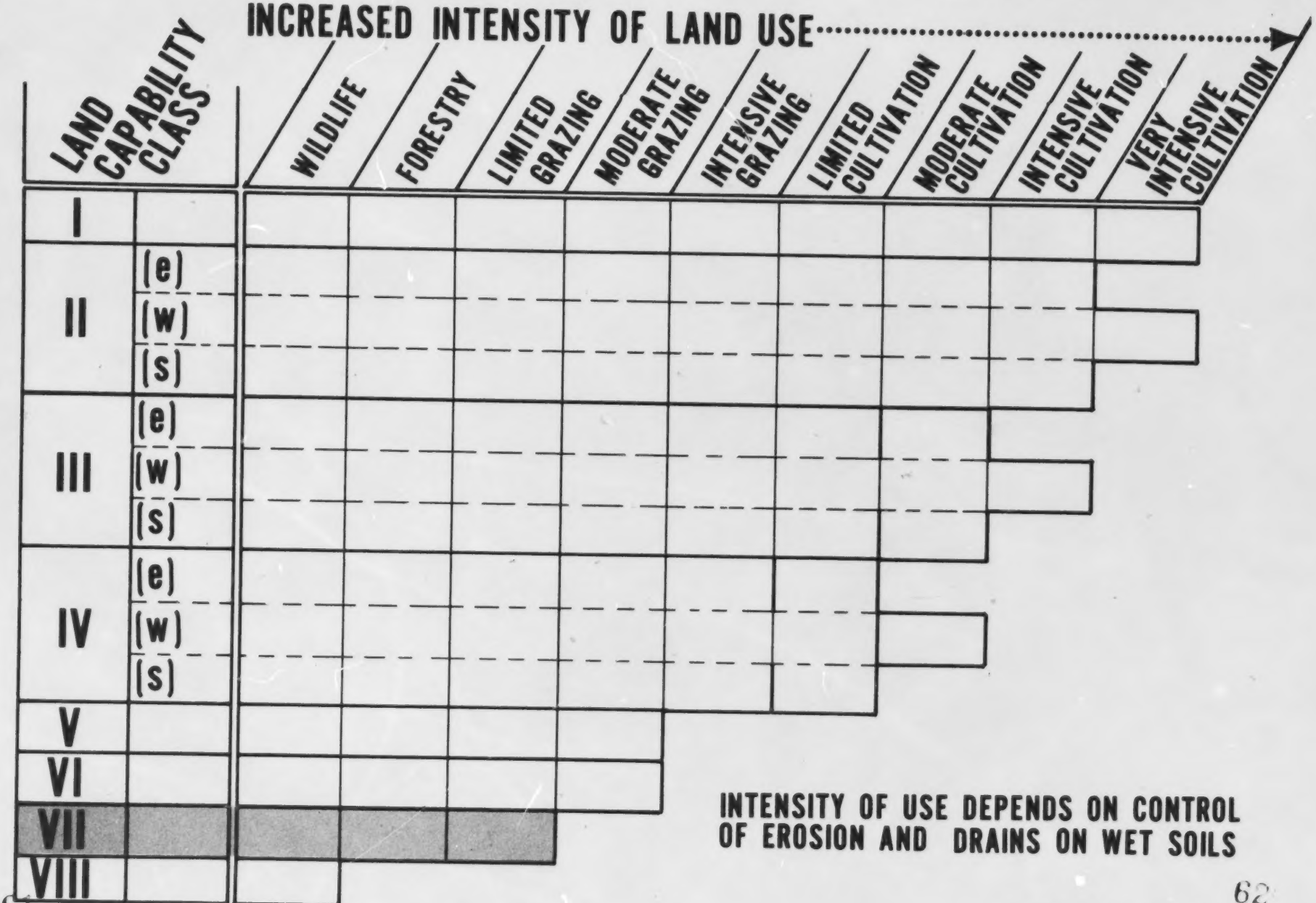
SUITABILITY FOR LAND USE ACCORDING TO CAPABILITIES



INTENSITY OF USE DEPENDS ON CONTROL OF EROSION AND DRAINS ON WET SOILS

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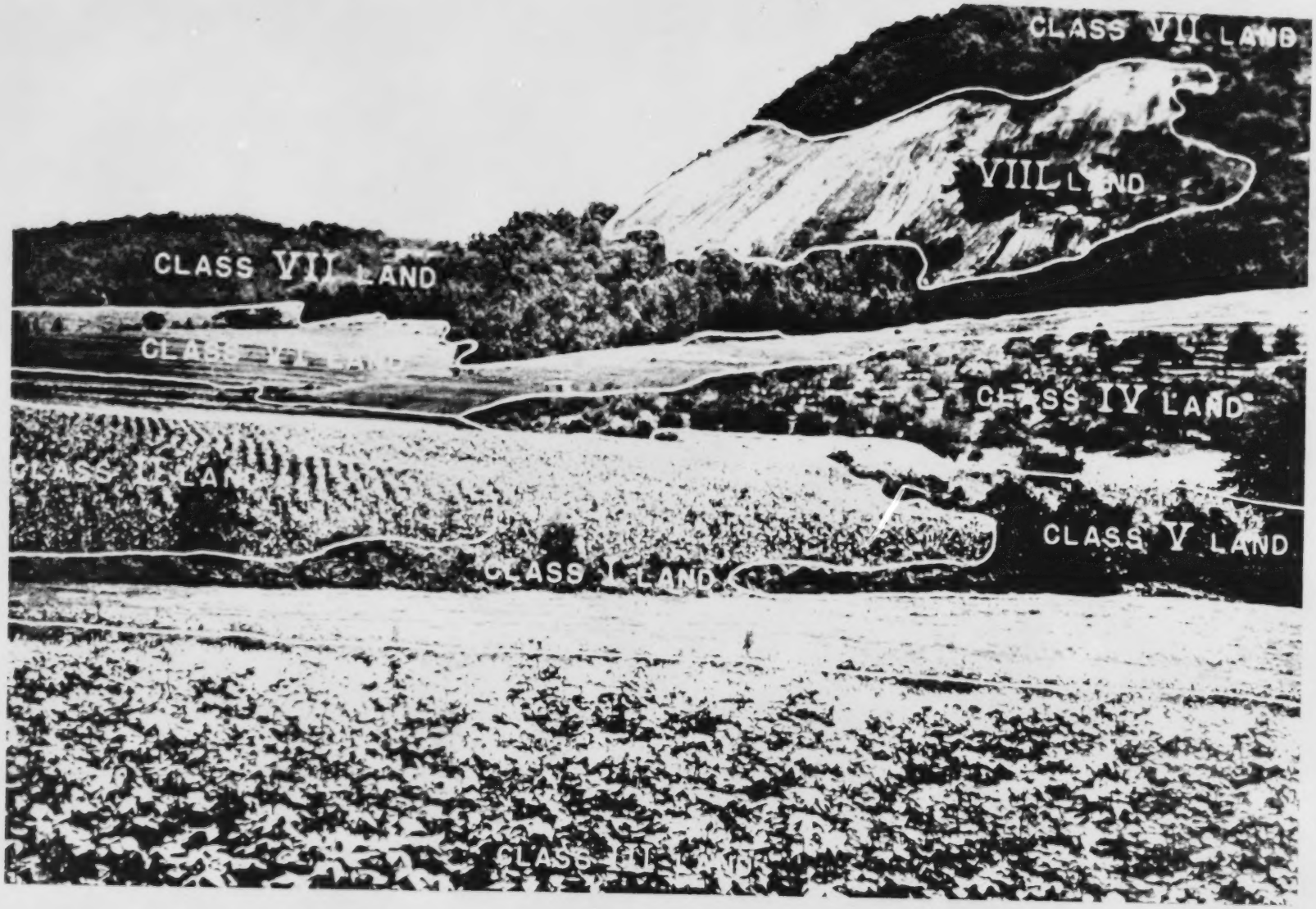
LAND CAPABILITY CLASSES



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LAND CAPABILITY CLASSES

SUITABLE FOR CULTIVATION

I REQUIRES GOOD SOIL MANAGEMENT PRACTICES ONLY

II MODERATE CONSERVATION

III INTENSIVE CONSERVATION PRACTICES NECESSARY

IV PERENNIAL VEGETATION-INFREQUENT CULTIVATION

NO CULTIVATION (Pasture, Hay, Woodland and Wildlife)

V NO RESTRICTIONS IN USE

VI MODERATE RESTRICTIONS IN USE

VII SEVERE RESTRICTIONS IN USE

VIII BEST SUITED FOR WILDLIFE AND RECREATION

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CLASS	SURFACE TEXTURE	SUBSOIL PERMEABILITY	DEPTH OF SUBSOIL AND TOPSOIL	DRAINAGE	EROSION	% SLOPE	SURFACE LAYER
CLASS I SOIL							
I	LIGHT OR MEDIUM	MODERATE	DEEP	GOOD	NONE TO SLIGHT	0-2%	
"E" SOIL CLASSES							
IIe	COARSE, LIGHT OR MEDIUM	MODERATE OR SLOW	DEEP OR MOD. DEEP	FAIR	NONE TO SLIGHT OR MODERATE	2-6%	
IIIe	COARSE, LIGHT OR MEDIUM	MODERATE OR SLOW	DEEP OR MOD. DEEP	GOOD	SEVERE	2-6%	
					NONE TO SLIGHT OR MODERATE	6-10	
IVe	COARSE, LIGHT, MEDIUM OR FINE	MODERATE OR SLOW	DEEP, MOD. DEEP, OR SHALLOW	GOOD	VERY SEVERE	2-6	
					SEVERE	6-10	
					NONE TO SLIGHT OR MODERATE	10-15	
		MODERATE OR SLOW		GOOD		10-15	20-40 in. (.5-1 m)

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CLASS	SURFACE TEXTURE	SUBSOIL PERMEABILITY	DEPTH OF SUBSOIL AND TOPSOIL	DRAINAGE	EROSION	% SLOPE	SURFACE LAYER
Ve	NONE RECOGNIZED IN SOUTH CAROLINA						
VIe		MODERATE OR SLOW	DEEP, MOD.DEEP, OR SHALLOW		VERY SEVERE	6-10	
					SEVERE	10-15	
					NONE TO SLIGHT OR MODERATE	15-25	
VIIe			DEEP, MOD. DEEP, OR SHALLOW		VERY SEVERE	10-15	
					SEVERE OR VERY SEVERE	15-25	
					ANY DEGREE	25-40	
					ANY DEGREE	40+	
VIIIe	NONE RECOGNIZED IN SOUTH CAROLINA						

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CLASS	SURFACE TEXTURE	SUBSOIL PERMEABILITY	DEPTH OF SUBSOIL AND TOPSOIL	DRAINAGE	EROSION	% SLOPE
"W" SOIL CLASSES						
IIw	LIGHT OR MEDIUM	MODERATE OR SLOW	DEEP OR MOD. DEEP	FAIR	ALLUVIAL OR COLLUVIAL NONE TO SLIGHT	0-2
IIIw	LIGHT, MEDIUM OR FINE	RAPID, MODERATE OR SLOW	DEEP OR MOD. DEEP	POOR	ALLUVIAL OR COLLUVIAL NONE TO SLIGHT	0-2
IVw	LIGHT, MEDIUM OR FINE	RAPID, MODERATE OR SLOW	DEEP OR MOD. DEEP	VERY POOR	ALLUVIAL OR COLLUVIAL NONE TO SLIGHT	0-2
Vw	NOT FEASIBLE TO DRAIN			VERY POOR		0-2
VIw	WATER STANDS AT OR ABOVE THE SURFACE FOR LONG PERIODS OF TIME					0-2
VIIw	PERMANENTLY WET, SWAMPY - COVERED WITH WATER MOST OF THE TIME					0-2
VIIIw	SALT WATER TIDAL MARSH					0-2

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CLASS	SURFACE TEXTURE	SUBSOIL PERMEABILITY	DEPTH OF SUBSOIL AND TOPSOIL	DRAINAGE	EROSION	% SLOPE	SURFACE LAYER
"S" SOIL CLASSES							
IIs	COARSE	MODERATE or SLOW	DEEP or MOD. DEEP	GOOD	NONE to SLIGHT	0-2 or 2-6	20-40 in. .5-1m
	COARSE or LIGHT	SLOW	DEEP	GOOD	NONE to SLIGHT	0-2	LESS THAN 20 in.
IIIs	COARSE	RAPID	DEEP	FAIR or EXCESSIVE	NONE to SLIGHT	0-2 or 2-6	MORE THAN 40 in.
	COARSE	MODERATE or SLOW	DEEP	GOOD	NONE to SLIGHT	6-10	20-40 in.
IVs	COARSE	VERY RAPID	DEEP	EXCESSIVE	NONE to SLIGHT	0-2 or 2-6	MORE THAN 40 in.
		RAPID or VERY RAPID				6-10 or 10-15	
		MODERATE			NONE to SLIGHT	15-25 25-40 40+	VERY STONY

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CLASS	SURFACE TEXTURE	SUBSOIL PERMEABILITY	DEPTH OF SUBSOIL AND TOPSOIL	DRAINAGE	EROSION	% SLOPE	SURFACE LAYER
"S" SOIL CLASSES, CONTINUED							
Vs	NONE RECOGNIZED IN SOUTH CAROLINA						
VIs	COARSE	RAPID OR VERY RAPID	EXCESSIVE		NONE to SLIGHT	10-15	MORE THAN 40 in.
					NONE to SLIGHT	6-10 10-15	VERY STONY
VIIs						15-25 25-40 40+	VERY SANDY and DROUGHTY or VERY STONY
VIIIs	THIS INCLUDES ROCK OUTCROPS, EXTREMELY STONY LAND, AND BEACHES.						

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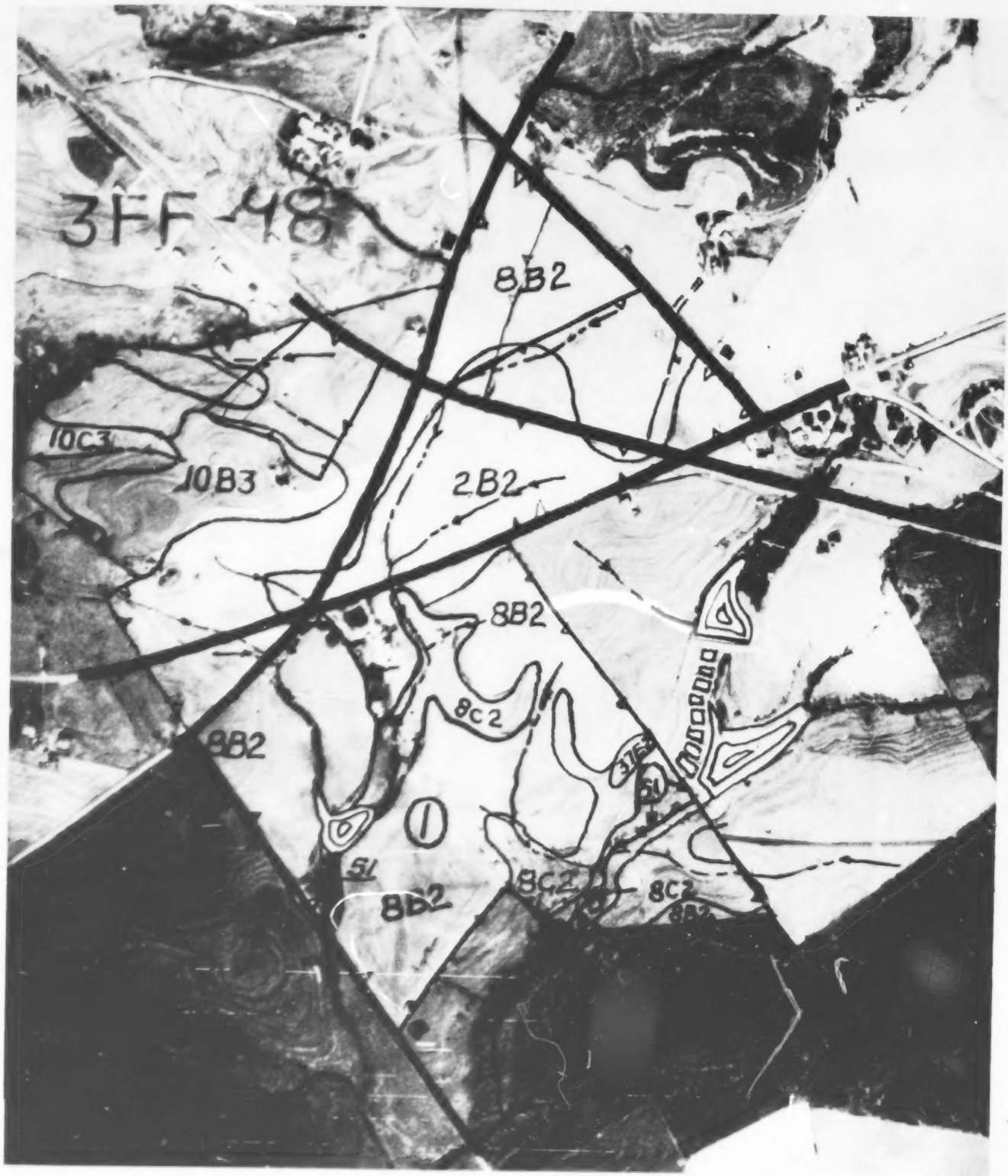
SAMPLE OF A SOIL AND CAPABILITY MAP



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DESCRIPTIONS OF SOILS SHOWN ON THE SOIL AND CAPABILITY MAP

SC-CONS-4
Revised 12-73

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
COLUMBIA, SOUTH CAROLINA

SOIL SURVEY INTERPRETATIONS
For Conservation Planning

Anderson County

Frank Farr
(Owner)

ES-3FF-54 (1)
(Photo Sheet and Farm No.(s))

Map Symbol	Soil Name	Capability Unit	Woodland Suitability Group	Description
2B2 8B2	Appling sandy loam Cecil sandy loam	IIe-6 IIe-6		Gently sloping soils on uplands with slight to moderate erosion. These soils have loamy surface layers and yellowish, brownish, or reddish clayey to loamy subsoils through which water moves at a moderate or moderately rapid rate.
8C2	Cecil sandy loam	IIIe-5		Gently sloping soils with slight to severe erosion and sloping soils with slight to moderate erosion. Deep or moderately deep, reddish or brownish soils through which water moves at a moderate rate.
37E2	Pacolet sandy loam	VIe-2		Moderately or severely eroded sloping soils or strongly sloping to steep soils on uplands. These soils have firm or friable clayey or loamy subsoils through which water moves at a moderate rate.
51	Worsham	Vw-4		Nearly level to gently sloping, poorly drained soils. These soils have gray loamy surface layers and gray clayey subsoils.

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A SOIL AND WATER CONSERVATION PLAN

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A RECORD OF THE IMPROVEMENTS TO BE MADE

SCS-CONS-69
Rev. 9-70
File Code CN-11

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

RECORD OF COOPERATOR'S DECISIONS
AND PROGRESS IN APPLICATION

COOPERATOR Frank Farr
ASSISTED BY George L. Watkins
DATE 10-25-74

FIELD NUMBER	PLANNED		APPLIED		LAND USE AND TREATMENT M-1-5
	AMOUNT	YEAR	AMOUNT	MONTH AND YEAR	
					CROPLAND
7	16 Ac.	1976			Conservation Cropping System: Establish a two-year strip rotation of 8 acres of small grain followed by no-till planted soybeans in alternate strips with 8 acres of cotton.
7	0.5 Ac.	1975	0.5 Ac.	10/75	Grassed Waterways or Outlets: Clear and shape shallow waterway to
4	0.5 Ac.	1976			planned design. Prepare seedbed and plant to fescue and clover. Use soil test as a guide in applying lime and fertilizer. Mulch with two tons per acre of grain straw.
					PASTURELAND
1	24 Ac.	1975	24 Ac.	10/75	Pasture and Hayland Planting: Plant to fescue and ladino clover. Use soil test as a guide for applying lime and fertilizer.

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SOIL IDENTIFICATION PLACING CARD

SOIL IDENTIFICATION PLACING CARD

Group No. _____ Field No. _____
(Indicate your answer by an (X) in the square.)

Contestant Number _____
(Indicate rotation by circling the year)

PART I—LAND CLASS FACTORS -30 Points

SCORE

Surface Texture
- ☐ Coarse
- ☐ Light
- ☐ Medium
- ☐ Fine

Subsoil Permeability
- ☐ Slow
- ☐ Moderate
- ☐ Rapid
- ☐ Very Rapid

Depth of Surface Soil and Subsoil
- ☐ Deep
- ☐ Moderately Deep
- ☐ Shallow
- ☐ Very Shallow

Drainage
- ☐ Very Poor
- ☐ Poor
- ☐ Fair
- ☐ Good
- ☐ Excessive

Erosion — Wind or Water
- ☐ Alluvial Deposits
- ☐ Colluvial Deposits
- ☐ None to Slight
- ☐ Moderate
- ☐ Severe
- ☐ Very Severe
- ☐ Very Severe Gullied

Slope
- ☐ Nearly Level
- ☐ Gently Sloping
- ☐ Sloping
- ☐ Strongly Sloping
- ☐ Moderately Steep
- ☐ Steep
- ☐ Very Steep

Major Factors Considered
- ☐ Texture
- ☐ Permeability
- ☐ Depth
- ☐ Slope
- ☐ Erosion
- ☐ Drainage

Land Capability Class No.
- ☐ Class I
- ☐ Class II
- ☐ Class III
- ☐ Class IV
- ☐ Class V
- ☐ Class VI
- ☐ Class VII
- ☐ Class VIII

Indicate Subclass Except on Class I

PART II—LAND TREATMENT—30 Points

SCORE

- ☐ 1. **Plant to row crops**
- ☐ 2. Farm on contour
- ☐ 3. Terrace and farm on contour
- ☐ 4. Establish meadow outlets
- ☐ 5. Establish strip rotation (2-3-4 yr.)
- ☐ 6. Establish rotations within field (2-3-4 yr.)
- ☐ 7. Establish field rotation (2-3-4 yr.)
- ☐ 8. Plant row crops each year with winter cover crop
- ☐ 9. Establish strips for wind erosion control
- ☐ 10. Plant perennial strips
- ☐ 11. Burn no crop residue
- ☐ 12. Establish drainage system
- ☐ 13. [illegible] perennial strips on ditch and road banks
- ☐ 14. Plan wildlife food strips on field borders
- ☐ 15. Apply limestone
- ☐ 16. Apply complete fertilizer
- ☐ 17. Apply nitrogen topdressing
- ☐ 18. Apply phosphate
- ☐ 19. Apply potash
- ☐ 20. **Establish permanent pasture**
- ☐ 21. **Plant to perennials**
- ☐ 22. Plow and reseed pasture
- ☐ 23. Mow or spray pasture or perennials for weed control
- ☐ 24. Topseed winter annuals on pasture
- ☐ 25. Harrow and seed to thicken sod
- ☐ 26. Cut brush or briars in pasture
- ☐ 27. Cross fence for rotational grazing
- ☐ 28. Practice rotational grazing
- ☐ 29. Provide water facilities for livestock
- ☐ 30. **Plant to trees**
- ☐ 31. Plow firebreaks
- ☐ 32. Mark, Measure and Thin for Pulpwood
- ☐ 33. Mark, measure, and sell timber
- ☐ 34. Do Timber Stand Improvement—Cut or poison low grade trees
- ☐ 35. Replant open spaces in woods
- ☐ 36. Plant wildlife patches in openings in woods
- ☐ 37. Protect woods from damage by grazing
- ☐ 38. Clearcut and Plant to Trees
- ☐ 39. **Develop into wildlife area**

SCORE PART I (Possible 30) _____

SCORE PART II (Possible 30) _____

TOTAL SCORE (Possible 60) _____

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CONDITIONS OF FIELD FOR FFA SOIL JUDGING
FIELD NO. 1

FIELD No. 1

1. ASSUMED SOIL TEST. pH 5.3, PHOSPHATE VL, POTASH MED.
2. PAY NO ATTENTION TO CONSERVATION PRACTICES ON FIELD.
3. THICKNESS OF ORIGINAL TOPSOIL WAS 10 INCHES (25.4 cm).
4. FIELD TO CONSIDER IS 25 (APPROX. 10 HECTARES) ACRES CULTIVATED.
5. CONSIDER THE (MOST INTENSIVE) USE OF THE LAND.
6. OTHER CONDITIONS ARE GENERAL FARM-FIELD BORDERS A HIGHWAY ON ONE SIDE AND WOODS ON ANOTHER .
7. USE 10 PRACTICES IN PART II.

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SOILS TRANSPARENCIES
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